

## CLAIMS

1. An apparatus for evaluating manual dexterity and object manipulation in humans comprising:  
  
connection structure to connect two hands, wherein each hand is capable of transmitting a force onto the other hand via the connection structure; and  
  
a unit to measure and record omnidirectional forces applied by each hand.
2. An apparatus as claimed in claim 1, wherein one person holds the connection structure between both hands.
3. An apparatus as claimed in claim 1, wherein the connection structure is held by two people, with each person holding the apparatus by one hand.
4. An apparatus as claimed in claim 1, wherein the connection structure is provided by a hand-held unit.
5. An apparatus as claimed in claim 1 further comprising a control unit in communication with the measure and record unit to record and analyze forces received by the measure and record unit.
6. An apparatus as claimed in claim 5, wherein the control unit is provided by a computer and a variety of peripheral devices including at least one of speakers and a display screen.

7. An apparatus as claimed in claim 6, wherein the computer is configured by a customised control program.
8. An apparatus as claimed in claim 4, wherein the hand-held unit comprises a pair of handles attachable about either end of a joining member and in use the joining member transmits forces between said handles.
9. An apparatus as claimed in claim 8, wherein the handles are fixed to the joining member.
10. An apparatus as claimed in claim 8, wherein the handles are rotatable about the longitudinal axis of the joining member.
11. An apparatus as claimed in claim 8, wherein transducers are fitted between the handles and the joining member in order to measure the torque applied by the subject to each handle of the hand-held unit.
12. An apparatus as claimed in claim 11, wherein each handle has a pair of grip surfaces to receive any of the digits of a person's hand.
13. An apparatus as claimed in claim 8, wherein the grip surfaces are provided by longitudinally extending hemi-cylindrical ridges co-axial with the longitudinal axis of the joining member when the handles are mounted on the joining member.

14. An apparatus as claimed in claim 12, wherein the distance between the grip surfaces is in the range of 10 to 40 millimetres.

15. An apparatus as claimed in claim 8, wherein the handles of the apparatus are equipped with transducers to measure omnidirectional forces generated by the subject at each of the grip surfaces.

16. An apparatus as claimed in claim 11, wherein the transducers measure internal forces due to asymmetric applications of the gripping forces produced by opposing digits at each grip surface along with measurements of the points of force pressure centres.

17. An apparatus as claimed in claim 8, wherein the handles are attachable about either end of the joining member.

18. An apparatus as claimed in claim 8, wherein the handles are interchangeable with handles having alternative geometries.

19. An apparatus as claimed in claim 8, wherein the handles have parallel, tapered or curved surfaces.

20. An apparatus as claimed in claim 8, wherein the geometry of each handle is adjustable by mechanical, electrical and/or other non-manual structure.

21. An apparatus as claimed in claim 8, wherein a shield is placed between the subject and the handles.

22. An apparatus as claimed in claim 8, wherein the joining member comprise two sections and a coupling mounted between the sections.

23. An apparatus as claimed in claim 22, wherein the two sections are inter-engaged to allow compression and extension of the members along their longitudinal axis in response to push/pull forces applied by a subject and the coupling applies a predetermined biasing force opposing the compression and extension of said members.

24. An apparatus as claimed in claim 22, wherein the coupling is in communication with the computer and the biasing force applied by the coupling can be momentarily removed in response to a signal from the computer and subsequently reapplied.

25. An apparatus as claimed in claim 24, wherein the computer generates the signal at random times during the test.

26. An apparatus as claimed in claim 24, wherein the signal is generated by the computer in response to a predetermined time having elapsed from commencement of the test, in response to a certain force applied to the coupling by the subject or in response to a certain distance travelled by the two sections of either member as a result of a force applied by the subject.

27. An apparatus as claimed in claim 6, wherein the computer generates signals providing information for subjects taking the test.

28. An apparatus as claimed in claim 27, wherein the information includes a demonstration and instructions for the subject taking the test.

29. An apparatus as claimed in claim 27, wherein the signals may be audible, visible and/or tangible.

30. An apparatus as claimed in claim 27, wherein the signals include various target forces for subjects to aim for.

31. An apparatus as claimed in claim 27, wherein the signals are output as a visual display on a screen.

32. An apparatus as claimed in claim 27, wherein the signal is output as an audible signal via speakers.

33. An apparatus as claimed in claim 31, wherein the screen is a freestanding unit located in front of the person.

34. An apparatus as claimed in claim 31, wherein the screen is mounted on the joining member between the two handles.

35. An apparatus as claimed in claim 6, wherein the computer comprises a unit to receive and store input forces measured by the transducers.

36. An apparatus as claimed in claim 6, wherein the computer comprises a unit to compare the forces received with a set of control values which are input by a the experimenter.

37. An apparatus as claimed in claim 6, wherein the computer generates a signal informing the person that they have successfully completed the current section of the test.

38. An apparatus as claimed in claim 31, wherein the visual display includes a pre-test demonstration using graphical symbols or characters showing the subject what they are required to do.